

In re Application of: Ernest GRIMBERG
Serial No.: 10/574,462
Filed: March 31, 2006
Final Office Action Mailing Date: Dec. 30, 2009

Examiner: Djura MALEVIC
Group Art Unit: 2884
Attorney Docket: 31363
Confirmation No.: 2546

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 63-69, 71-80 and 82-90 are in this Application. Claims 63-69, 71-80 and 82-90 have been rejected under 35 U.S.C. § 103. Claims 70 and 81 have been canceled in a previous response. Claims 63, 71, 72, 74, 75 and 77 have been amended without prejudice herewith.

Amendments To The Claims

35 U.S.C. §103 Rejections – Yang in view of Kauer

The Examiner rejected claims 63-64, 66-69, 71, 73-80 and 82-85 as being unpatentable over WO Publication No. 01/388825 by Yang et al. (hereinafter *Yang*), in view of US Patent Application Publication No. 2004/0106211 by Kauer et al. (hereinafter *Kauer*). It is submitted in response that amended independent claims 63 and 77 (and claims 64, 66-69, 71, 73-76, 77-80 and 82-85 dependent thereon) are patentable, in the light of arguments set forth below.

The Examiner states that although *Yang* fails to expressly disclose feedback, such a feedback is implied by *Yang*. The Examiner further states that in *Yang* windows are continuously reconfigured in response to time varying dynamics which include target position, scale and tracking gates, and that appropriate control vectors are sent by *Yang's* processor to the imager. The Examiner presents *Kauer* as an example of feedback control of device sensitivity, discrimination and detection.

Applicant acknowledges that feedback loops per se are well known in the art. However the implementation and effects of the feedback within a given system may vary greatly. Many factors distinguish between feedback loops in a system. These factors include: the elements of the system which are controlled by the feedback loop,

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the variable used to generate the feedback signal, and the manner in which the feedback signal is utilized in order to control the system. Differences in one or more of these elements may result in completely different system behavior.

Applicant hereby amends claim 63 to state that feedback signal is generated in accordance with a property indicative of image quality. Such properties include SNR and image contrast, as claimed in dependent claims 86, 87, 89 and 90. The feedback signal is generated if the image quality property crosses a threshold.

Claim 63 now states:

63. An infrared sensor comprising:
 a sensor array comprising multiple IR sensors, configured for collecting IR energy from an external scene;
 an image processor, configured for processing a sensor array output signal to obtain an IR image, for analyzing said image to determine a property of said IR image, said property being indicative of image quality, and for generating a feedback signal in accordance with said property if said property crosses a threshold; and
 a sensitivity adjuster associated with said sensor array, configured for deriving a required image sensitivity by adjusting between a field of view and a grouping of sensing pixels in accordance with said feedback signal.

Corresponding amendments have been made to independent claim 77. Support is found *inter alia* on p. 9 lines and on p. 14 line 30 to p. 15 line 7.

The claimed embodiments relate specifically to the factors which distinguish between feedback loops. In the claimed embodiments the property used to generate the feedback signal is indicative of the quality of the IR image. The feedback signal is generated when the image quality property crosses a threshold, in other words when the image quality improves or deteriorates in a manner requiring readjustment of the sensor field of view and pixel grouping.

For clarity, Applicant describing the teachings of *Yang* and *Kauer* individually but are traversing the rejection with respect to the combination of these references, *infra*. That is, the Applicants are not attacking the references individually, rather addressing the combinations of references as set forth in the instant Office Action.

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The Examiner states that *Yang's* target tracking implies the use of feedback within the imager. Applicant respectfully asserts that Yang does not teach utilizing feedback as claimed herein. Specifically, *Yang* does not disclose analyzing an image to determine the image quality and generating a feedback signal in accordance with an image quality property. Furthermore Yang does not disclose using the feedback signal within the system to adjust between a field of view and a grouping of sensing pixels to obtain a given sensitivity.

Yang's reconfigurable imager is directed at target tracking. Yang is concerned with two types of windows: windows for search and windows for target tracking (see Yang p. 41 lines 6-14). In Yang's reconfigurable imager the processor adjusts the sensor window sizes and resolutions in order to most effectively acquire and track targets. Typically search windows will have small window size and small super-pixel size, whereas tracking windows will have large window size and large pixel size. This is in contrast with the claim embodiments, in which improved sensitivity is obtained by reducing the readout region (i.e. window size) and/or increasing the pixel grouping size.

Like *Yang*, *Kauer* does not disclose generating a feedback signal in accordance with a property of an IR image, specifically a property indicative of image quality. In *Kauer*, the sensor outputs are analyzed independently not as an image. Since no image is generated in the system, it is impossible to generate the feedback signal from an image quality property. Furthermore, in *Kauer* the feedback loop is not implemented in order to obtain a required image sensitivity. *Kauer* analyzes the sensor output data only to determine which of the array sensors should be used for sampling or detection.

Additionally, neither *Yang* nor *Kauer* disclose generating a feedback signal when an image quality property crosses a threshold. Since neither *Yang* nor *Kauer* are generate a feedback signal in accordance with an image quality property, such a threshold is of no disclosed significance for controlling the sensor array properties.

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Regarding claims 71, 86 and 88, the Examiner states that Yang discloses an SNR detector for detecting an SNR of the image signal on p. 41 lines 6-14. Applicant fails to see how the referenced paragraph teaches an SNR detector, or specifically the use of the image SNR as the image quality property from which the feedback signal is generated. The referenced paragraph simply describes Yang's Fig. 24, which presents projected update rates for different window and super-pixel sizes. There is no discussion of image SNR.

In summary, Applicant respectfully believes that the mere knowledge that imager sensitivity may be controlled by means of feedback along with knowledge of *Yang's* reconfigurable imager would not render the claimed invention obvious to a person skilled in the art. In order to arrive at the claimed embodiments the feedback must be implemented as claimed herein. Neither *Yang* nor *Kauer*, alone or in combination, disclose "processing a sensor array output signal to obtain an IR image, for analyzing said image to determine a property of said IR image, said property being indicative of image quality, and for generating a feedback signal in accordance with said property if said property crosses a threshold" or a "deriving a required image sensitivity by adjusting between a field of view and a grouping of sensing pixels in accordance with said feedback signal". Applicant therefore respectfully believes that the Examiner's objections are overcome by the present amendments.

It is believed that the dependent claims are allowable as being dependent on an allowable main claim. The specific objections against the dependent claims are therefore not responded to individually.

35 U.S.C. §103 Rejections – Yang and Kauer in view of Hsieh

Claim 65 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Yang* and *Kauer* in view of Hsieh (NPL – "A New CMOS Circuit Design for the

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IR FPA..."), hereinafter *Hsieh*. It is submitted that claim 65 is patentable, in light of arguments set forth below.

The Examiner states that *Hsieh* teaches a CMOS based IR FPA, and that it would be obvious to a person skilled in the art to have adapted the CMOS detector as an IR FPA. However, *Hsieh* does not disclose "processing a sensor array output signal to obtain an IR image, for analyzing said image to determine a property of said IR image, said property being indicative of image quality, and for generating a feedback signal in accordance with said property if said property crosses a threshold" or a "deriving a required image sensitivity by adjusting between a field of view and a grouping of sensing pixels in accordance with said feedback signal". Thus neither *Yang* nor *Kauer* nor *Hsieh*, alone or in combination, teach or suggest all the limitations of claim 65.

35 U.S.C. §103 Rejections – Yang and Kauer in view of Park

Claims 72, 87 and 89 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Yang* and *Kauer* in view of *Park* (US Patent No. 4,782,396), hereinafter *Park*. It is submitted that claims 72, 87 and 89 are patentable, in light of arguments set forth below.

The Examiner states that *Park* teaches a sensor having an image processor with a contrast detector, and that it would be obvious to a person skilled in the art to have included *Park's* contrast detector with the invention disclosed by *Yang*. However, *Park* does not disclose "processing a sensor array output signal to obtain an IR image, for analyzing said image to determine a property of said IR image, said property being indicative of image quality, and for generating a feedback signal in accordance with said property if said property crosses a threshold" or a "deriving a required image sensitivity by adjusting between a field of view and a grouping of

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sensing pixels in accordance with said feedback signal". Thus neither *Yang* nor *Kauer* nor *Park*, alone or in combination, teach or suggest all the limitations of claims 72, 87 and 89.

Conclusion

In view of the above amendments and remarks it is respectfully submitted that claims 63-69, 71-80 and 82-90 are now in condition for allowance. A prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56,437
Telephone: 718.246.8482

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Enclosure:

- Request for Continued Examination (RCE)